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ABSTRACT

This study sought to determine what percentage of students entering teacher education needed remedial instruction in basic high school mathematics and what impact the remedial instruction had on those students. Fifty-four freshmen from Eastern Kentucky University who were planning to major in teacher education were given a 20-item pretest assessing basic high school mathematics concepts, including basic algebra, fractions, addition, geometry, calculation of area, and factorization. Ten students (19%) were able to pass at the minimum competency level of 85%; the remaining 44 students were enrolled in the remedial course. A posttest was administered at the end of instruction. Results of a t-test on gain scores indicated a statistically significant difference. Implications of these findings for preparing mathematics education majors for teaching are briefly discussed. (Author/MNS)

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Remedial Math at the College Level: A Pilot Study

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Abstract

The purpose of this study was to determine what percentage of students entering teacher education needed remedial instruction in basic high school math and what impact the remedial instruction had on the students who needed remediation. The initial sample consisted of 54 freshman college students from Eastern Kentucky University (EKU) who were planning to major in teacher education. The study employed Campbell and Stanleys' (1963) pre-post test design using a 20 item parallel test that assessed basic high school mathematic concepts. The mathematic concepts included in the test were basic algebra, fractions, addition, geometry, calculation of area, and factorization. The subjects were given the pretest before any formal coursework was taken. A minimum competency level of 85% was established as passing. Those who did not pass were assigned to the remedial program. The results indicate that 10 of the 54 students (19%) were able to pass the pretest examination at the specified minimum level of competency. The remaining 44 students were enrolled in the remedial course. A posttest was administered at the end of instruction. A t-test for matched pairs was calculated between the pretest and posttest scores. The results indicated that a statistically significant difference existed between pre and post test scores in the instruction ($t(43) = 5.63$, $p < .001$). Implications of these findings for preparing math education majors for teaching will be discussed.

Remedial Math at the College Level: A Pilot Study

Many social, political, and economic factors have encouraged college bound students to pursue careers in areas other than teacher education. This problem has never been more true than in mathematics. Here, teacher shortages are reported to be most severe (Association for School, College, and University Staffing, 1984; National Center for Education Statistics, 1983).

Perhaps more important than total numbers of students not entering teacher education is the fact that the majority who do enroll score in the bottom portion of the Scholastic Aptitude Test (SAT) (Vance & Schlechty, 1982). Those few individuals who are recruited from the higher SAT scorers and become employed in education quickly leave the profession for opportunities in other areas (Schlechty & Vance, 1981).

Although the reasons for the decline in SAT scores has many causes, most authors concur that the decline represents a real drop in mathematical ability (Whitesitt, 1982). This fact is particularly true of the lowest scorers on the SAT; the group who is pursuing careers in teacher math education.

Hence, the purpose of this study was to determine what percentage of students entering teacher education needed remedial instruction in basic high school math and what impact a course in remedial instruction would have on those students who needed remediation.

Method

The 1984 fall semester freshman students enrolled in teacher education at Eastern Kentucky University participated in this study. During their first week of school, all students (N=54) were required to take a math competency examination. The examination consisted of 20 items which were representative of basic high school mathematics. The mathematic content areas included basic algebra, fractions, addition, geometry, calculation of area, and factorization. Those students who could not pass the examination at the 85% criterion level were required to take the remedial course. Upon completion of the remedial course students were given a parallel form of the pretest.

The remedial instruction consisted of 14 hours of self-paced, individualized instruction. The atmosphere of the classroom was relaxed with students working alone or in small groups. Students worked within the confines of the classroom or they were sent outside the classroom by the instructor to actively solve mathematical problems, identify mathematical concepts, or devise their own problems to solve.

Students were provided with a list of the types of problems (a portion of which would be word problems) they would devise. This exercise purported to force students to think inductively, using math vocabulary and concepts. Students were also given worksheets which included problems whose solutions required a working knowledge of the four operations of addition, subtraction, multiplication and

division for whole numbers, fractions, and decimals; basic algebra, geometry and factorization.

Many different types of problems were included on the worksheets. Additionally, students were provided with two computer programs designed to build basic math competency skills (Conlon & Gilmore, 1983; Keenholtz, 1983). The major emphasis of the remediation program was on vocabulary, area, perimeter, factorization and equations.

Results

Of the 54 subjects pretested for the study only 10 students (19%) passed the math pretest examination at the specified minimum level of competency of 85%.

The remaining students (n=44) who scored below the 85% criterion level on the pretest examination were retested after the 14 hour remedial course.

A t-test for matched pairs was then computed. Table 1 indicates the means, standard deviations, and t-values between pre and post testing. As can be seen from the table, a significant statistical difference existed between pre and post tests ($t(43)=5.63$, $p < .001$).

Discussion

The purpose of this study was to determine what percentage of students entering teacher education needed remedial instruction in basic high school math and what impact the remedial instruction had on the students who needed remediation. This was accomplished by

first comparing students' scores on the pretest to determine what percentage of students would pass the exam at the 85% criterion level. Secondly, pretest-posttest scores of students required to attend the remedial instruction were compared.

The results of this study indicate that a significant number of students entering teacher education at EKU are enrolling in the program without the prerequisite math skills necessary for successful completion of the four year college curriculum. This finding is not particularly startling when one considers that most education majors in general, and math education majors in particular, are being recruited from the bottom group of SAT scorers (Darling-Hammond, 1984). Because a large percentage of students are entering teacher education without the necessary math skills to complete the program, the onus of responsibility of college instructors points not to advancing mathematical expertise, but rather to the remediation of existing skills.

In an attempt to remediate math deficiencies found in entering freshman students at EKU, the pilot math project described in this paper was initiated. The results of that program indicated that the remedial course could have a statistically significant positive effect on students enrolled in the remedial course.

Conclusions

1. The majority of students entering teacher education at Eastern Kentucky University are not entering the teacher education

program with essential prerequisite high school math skills.

2. A remedial course in basic math concepts can be beneficial to many students who display math deficiencies upon entering college.

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Table 1

Pre-Post Test Comparison of Students Needing Remedial Instruction (n=44)

	Pretest	Posttest	t	p
Means	12.45	14.86	6.04	.001
Standard Deviations	2.56	3.55		